

Classical and Quantum Gravity 1995 vol.12 N7, pages 1685-1697

Quantum complex scalar field in two-dimensional spacetime with closed timelike curves and a time-machine problem

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Abstract

The quantum complex scalar field which obeys the automorphic condition in the two-dimensional spacetime with closed timelike curves and the chronology horizon is considered. The renormalized stress - energy tensor is obtained. It is shown that the value of the stress - energy tensor is regular at the chronology horizon for specific automorphic parameters. Thus the particular example of a field configuration is given for which the Hawking's chronology protection conjecture is violated.

<http://dx.doi.org/10.1088/0264-9381/12/7/010>
